500 Å Si-doped $In_{0.6}Ga_{0.4}As$ (1×10^{19} cm^{-3})
500 Å Si-doped InGaAs Grade (1×10^{19} cm^{-3})
1500 Å Si-doped GaAs (5×10^{18} cm^{-3})
500 Å Si-doped InGaP (4×10^{17} cm^{-3})
500-1800 Å C-doped $Ga_{1-x}In_xAs_{1-y}N_y$ ($1.5\text{-}4.5 \times 10^{19}$ cm^{-3}) $x \approx 3y$
7500 Å Si-doped GaAs (1×10^{16} cm^{-3})
5000 Å Si-doped GaAs (5×10^{18} cm^{-3})
GaAs SUBSTRATE

FIG. 1

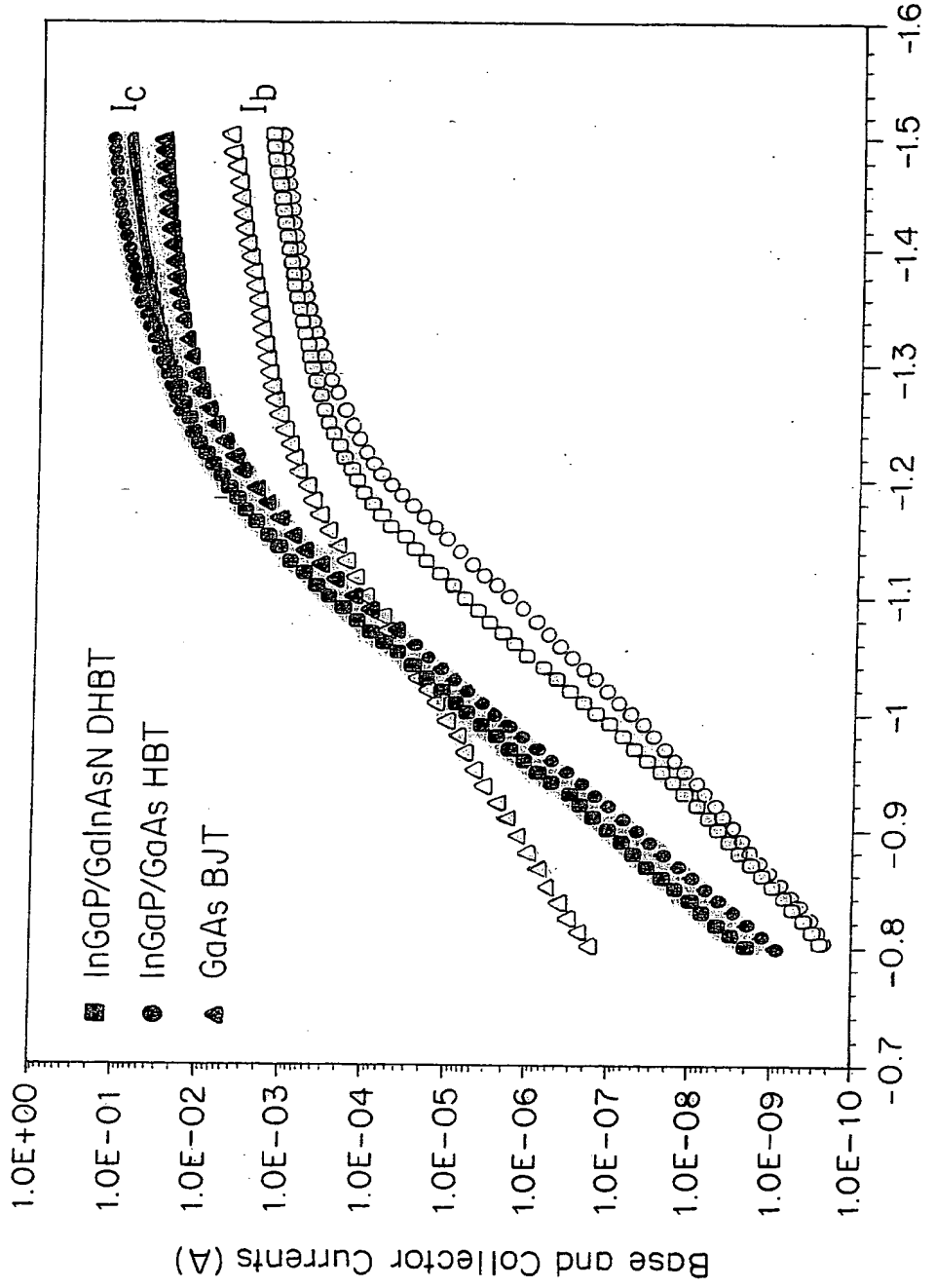
InGaP/GaInAsN DHBT
InGaP/GaAs HBT
GaAs BJT
I_c
I_b
Base and Collector Currents (A)
1.0E+00
1.0E-01
1.0E-02
1.0E-03
1.0E-04
1.0E-05
1.0E-06
1.0E-07
1.0E-08
1.0E-09
1.0E-10
-0.7
-0.8
-0.9
-1
-1.1
-1.2
-1.3
-1.4
-1.5
-1.6
V_{be}(V)

FIG. 2

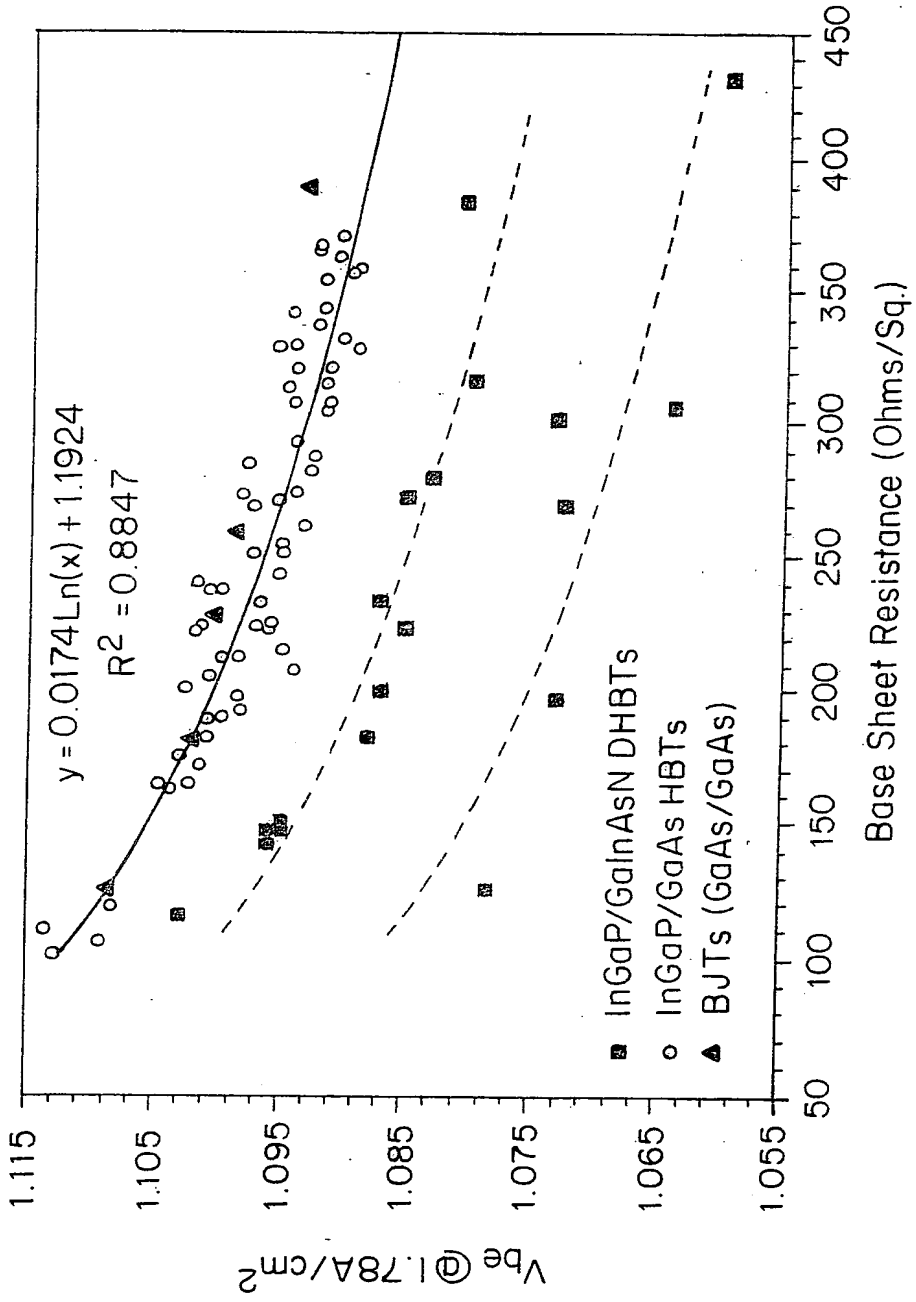
y = 0.0174Ln(x) + 1.1924
R2 = 0.8847
InGaP/GaInAsN DHBTs
InGaP/GaAs HBTs
BJTs (GaAs/GaAs)
Vbe @ 1.78A/cm2
Base Sheet Resistance (Ohms/Sq.)
1.115
1.105
1.095
1.085
1.075
1.065
1.055
50
100
150
200
250
300
350
400
450

FIG. 3

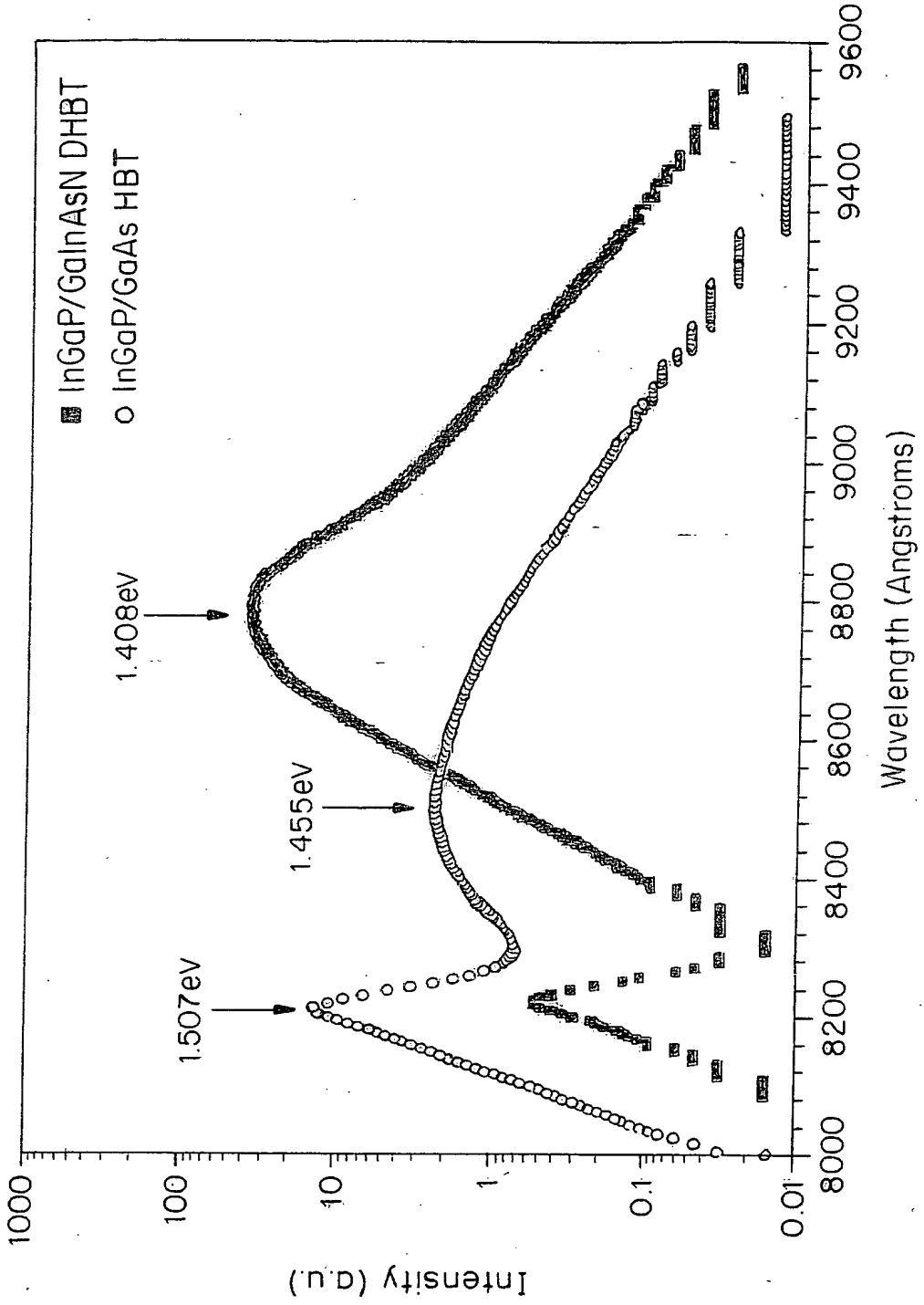
InGaP/GaInAsN DHBT
InGaP/GaAs HBT
1.408eV
1.455eV
1.507eV
Intensity (a.u.)
1000
100
10
1
0.1
0.01
8000
8200
8400
8600
8800
9000
9200
9400
9600
Wavelength (Angstroms)

FIG. 4

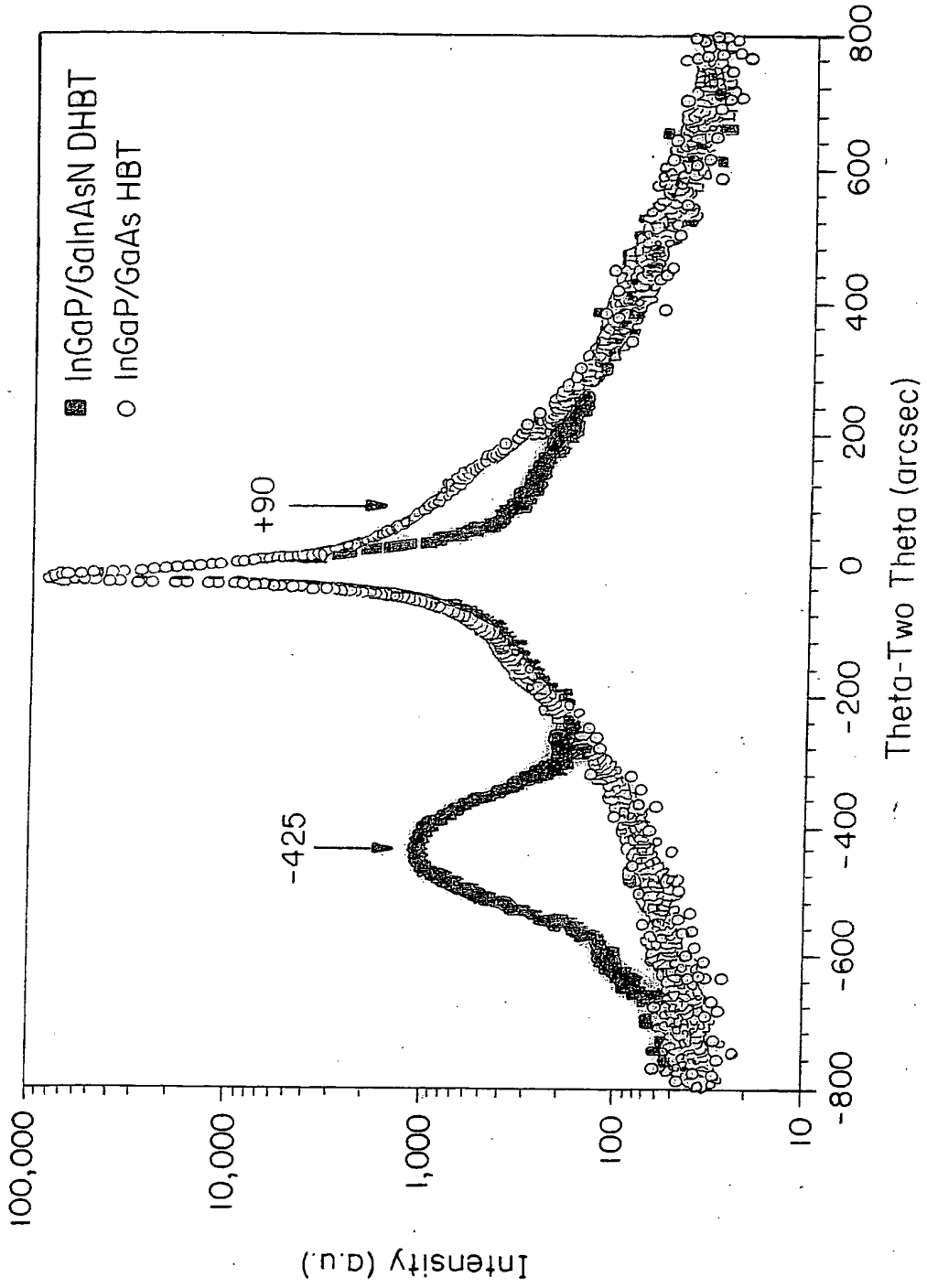
InGaP/GaInAsN DHBT
InGaP/GaAs HBT
+90
-425
Intensity (a.u.)
100,000
10,000
1,000
100
10
-800
-600
-400
-200
0
200
400
600
800
Theta-Two Theta (arcsec)

FIG. 5

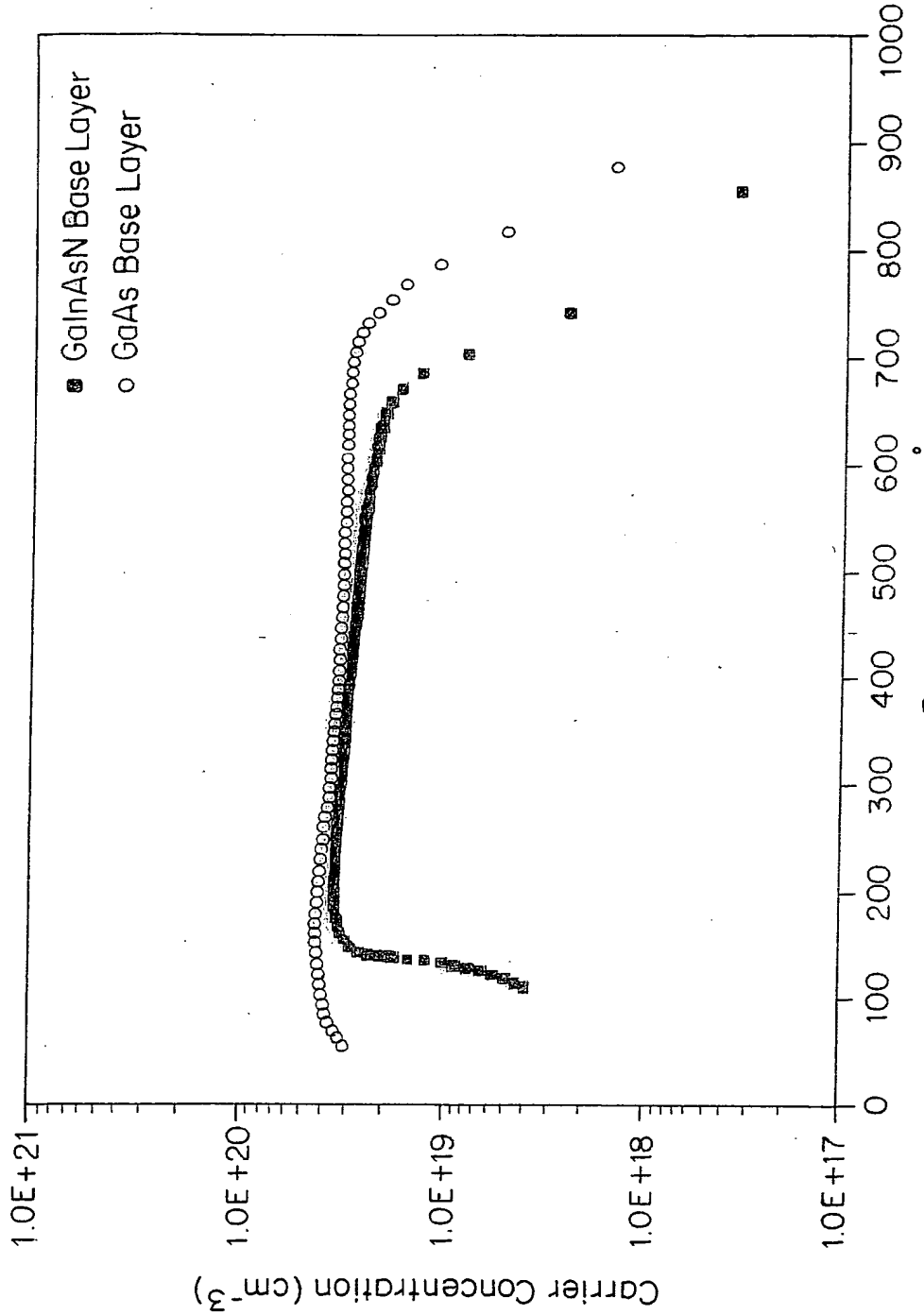
GaInAsN Base Layer
GaAs Base Layer
Carrier Concentration (cm⁻³)
1.0E+21
1.0E+20
1.0E+19
1.0E+18
1.0E+17
0
100
200
300
400
500
600
700
800
900
1000
Base Thickness (Å)

FIG. 6

500 Å Si-doped $In_{0.6}Ga_{0.4}As$ (1×10^{19} cm^{-3})
500 Å Si-doped InGaAs Grade (1×10^{19} cm^{-3})
1500 Å Si-doped GaAs (5×10^{18} cm^{-3})
500 Å Si-doped InGaP (4×10^{17} cm^{-3})
50 Å transitional layer
500 Å C-doped-$Ga_{1-x}In_xAs_{1-y}N_y$ (1.5-4.5 x 10^{19} cm^{-3}) $x \approx 3y$ compositional grade
50 Å transitional layer
~200 Å Si-doped InGaP
4000 Å Si-doped GaAs (1×10^{16} cm^{-3})
5000 Å Si-doped GaAs ($5 \times 10^{18} cm^{-3}$)
GaAs SUBSTRATE

FIG. 7